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# U.S. PATENT APPLICATION


Inventors: David L. HAYGOOD
Gary T. SCHWERTNER


Invention: UPHOLSTERY FABRIC TACK STRIPS AND METHODS OF MAKING SAME


*NIXON & VANDERHYE P.C.*
*ATTORNEYS AT LAW*
*1100 NORTH GLEBE ROAD*
*8TH FLOOR*
*ARLINGTON, VIRGINIA 22201-4714*
*(703) 816-4000*
*Telecopier (703) 816-4100*


# SPECIFICATION

# UPHOLSTERY FABRIC TACK STRIPS AND METHODS OF MAKING SAME

## CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of copending U.S. Patent Application Serial No. 10/180,102 filed on June 27, 2002, the entire content of which is expressly incorporated hereinto by reference.

## FIELD OF THE INVENTION

The present invention relates generally to the field of upholstery fabric tack strips and methods of making the same, especially tack strips that are used to attach upholstery fabric to an underlying furniture frame member.

## BACKGROUND AND SUMMARY OF THE INVENTION

Conventional upholstery tack strips are made from flat metal (e.g., metal) ribbons by a punch-press operation. Specifically, generally triangularly-shaped nails are formed by punching out correspondingly shaped, partially cut-out sections from the metal ribbon at spaced-apart locations along the ribbon's length and then bending the sections so each is at substantially a right angle relative to the ribbon stock. Thus, the nails remain unitarily attached to the metal ribbon, but project outwardly therefrom.

In use, the metal from which conventional tack strips are made can physically mar and/or abrade the upholstery fabric. For example, the ribbon, if formed from metal, may rust over time which might in turn visibly discolor the fabric. Furthermore, the edges of the metal tack strip may

abrade or cut the upholstery fabric. In order to prevent such problems, it has been conventional practice to provide upholstery tack strips with a separate C-shaped plastic sleeve which slides over the tack strip along its length. The plastic sleeve, however, is itself problematic in that it involves a separate manufacturing step to slideably mate it with the tack strip. Furthermore, unless some means are provided to restrict relative lengthwise movement between the metal tack strip and the sleeve, the latter can become separated from the former during use and/or installation.

In our recently issued U.S. Patent No. 6,537,646 B2 (the entire content of which is expressly incorporated hereinto by reference), novel upholstery tack strips are provided which include a thermoplastic sleeve and a metal ribbon embedded within the sleeve. The sleeve itself includes a plurality of removed material sections forming opposed pairs of sleeve windows, while the metal ribbon integrally includes nail sections which protrude outwardly from the tack strip through respective ones of the sleeve windows. Most preferably, the sleeve is extrusion-coated onto the metal ribbon stock using a cross-head die with a screw extruder. The thus-coated metal strip preform may then be transferred to downstream fabrication operations whereby the sleeve windows and nail portions are formed. Since the nail portions protrude outwardly from the tack strip through the sleeve windows, relative lengthwise slippage between the metal ribbon stock and the sleeve is prevented.

The present invention is directed specifically toward improvements to the upholstery tack strips of the type generally disclosed in our above-cited U.S. Patent No. 6,537,646 B2. More specifically, according to the present invention upholstery tack strips include a metal ribbon and a thermoplastic sleeve covering at least a portion of the ribbon. The sleeve

includes at least one lengthwise removed strip section so as to expose a corresponding lengthwise surface of the metal ribbon. Most preferably, at least one (and advantageously both) edges of the metal ribbon are knurled or serrated so as to present a roughened surface to the sleeve and thereby anchor the metal ribbon to the sleeve and thereby assist in maintaining the relative positioning of the sleeve and metal ribbon. An adhesive may optionally alternatively or additionally be applied to the metal ribbon so as to also assist in anchoring the thermoplastic sleeve thereto. The metal ribbon integrally includes nail sections which protrude outwardly from said tack strip.

These and other aspects and advantages will become more apparent after careful consideration is given to the following detailed description of the preferred exemplary embodiments thereof.

## BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

Reference will hereinafter be made to the accompanying drawings, wherein like reference numerals throughout the various FIGURES denote like structural elements, and wherein;

FIGURE 1 is a schematic view showing a possible manufacturing sequence in accordance with the present invention;

FIGURE 2 is a top perspective view showing a representative length of an upholstery tack strip in accordance with the present invention; and

FIGURE 3 is a bottom perspective view showing a representative length of an upholstery tack strip in accordance with the present invention.

## DETAILED DESCRIPTION OF THE INVENTION

Accompanying FIGURE 1 depicts one possible manufacturing sequence for making the upholstery tack strip of the present invention. In this regard, a roll of metal strip or ribbon stock 10 may be fed to and through the cross-head die 12a associated with screw extruder 12. Prior to being fed through the cross-head die 12a, however, the ribbon 10 is preferably pulled through a knurling tool 12b which may include, for example, a pair of opposed knurled rollers acting on at least one, and preferably both, of the lateral edges of the metal ribbon 10 so as to knurl the same as shown by reference numeral 10a in FIGURES 2-3 below. In this manner, the knurled edges 10a present a roughened surface to the thermoplastic sleeve applied via the cross-head die 12a so as to assist in anchoring the ribbon 10 thereto. The ribbon 10 may optionally alternatively or additionally be pulled through an adhesive applicator 12c which serves to apply an adhesive material onto the ribbon 10 and thereby assist in anchoring the thermoplastic sleeve thereto which will be applied via the cross-head die 12a.

As is well known, thermoplastic pellets may be fed into the hopper (not shown) of the screw extruder 12. The extruder 12 thus forms a molten stream of the thermoplastic material which is fed into the cross-head die 12a and applies a coating over the entire surfaces of metal ribbon 10. The coated ribbon (now designated by numeral 13 in FIGURE 1) then enters a water quench bath 14. Upon cooling, therefore, the thermoplastic material is thereby coated onto the metal ribbon stock 12 so as to form a composite strip preform 16. Specifically, the preform 16 includes a core of the metal ribbon stock 10 which is embedded within, and thus coated entirely by, a sleeve formed of solidified thermoplastic

material (i.e., the solidified residue of the thermoplastic material applied in its molten state by the cross-head die 12a).

Virtually any thermoplastic material may be employed in accordance with the present invention. Preferred thermoplastic materials include polyolefins (e.g., polyethylene and polypropylene), nylons, polyesters, polyvinyl chlorides and the like.

The composite strip preform 16 passes through an air dryer 18 which serves to remove water from the surface of the perform 16 prior to being directed to a cutter 20a. The perform is pulled from the roll of stock 10 through the cross-head die 12a, quench bath 14 air dryer 18 and cutter 20a via an opposed set of pull rolls 22-1, 22-2. The cutter 20a serves to cut a substantially centrally located longitudinally oriented strip section 16a of the thermoplastic coating, which strip 16a is then removed from the upper and lower surfaces, respectively, of the metal stock 10 via roller pairs 24a. The removed thermoplastic strip 16a is then collected in waste bin 26a for recycling to the extruder 12 where it can be re-melted and combined with virgin thermoplastic material so as to coat the stock 10 in the cross-head die as was explained previously.

Optionally, a cutter 20b, rollers 24b and waste bin 26b may be provided so as to remove a strip 16b from the opposite surface of the composite strip 16. If such a strip 16b is removed, then a pair of longitudinally extending exposed surface regions of the metal ribbon 10 will result. That is, with removal of both strips 16a, 16b, only the side edge regions of the stock 10 will be covered with the thermoplastic material forming generally U-shaped edge protectors. Most preferably, however, as shown in FIGURES 2 and 3, only the bottom strip 16a is

removed thereby exposing a lengthwise extending section 10b of the lower surface of the metal strip 10 (see FIGURE 3).

The edge-coated perform (now designated by reference numeral 16-1 in FIGURE 1) may subsequently be formed into a roll 30 and then used as a feed for a coining/punching operation 32 as shown in FIGURE 1. Alternatively, the composite strip preform 16 may be fed continuously from the cross-head die 12a, through the cutter 20a and then to the coining/punching operation 32.

During the coining/punching operation 32, nail-forming punch dies are brought to bear directly against the upper and lower surfaces metal strip 10. Thus, as with conventional tack strips, therefore, the coining/punching operation 32 serves to punch out generally triangularly shaped nails 10-1 from the metal ribbon 10 and bend them at substantially right angles thereto as shown in accompanying FIGURES 2 and 3. The finished tack strip TS in accordance with the present invention may then be cut into desired lengths (e.g., from about 3 inches in length up to about 48 inches in length), packaged and shipped in operation 36 as shown in FIGURE 1.

As can be appreciated, removal of the strip 16a will form a pair of opposed edge protectors 16c, 16d as an integral extruded member which covers the lateral edges of the metal ribbon stock 10. That is, the removal of the strip 16a to expose the lower surface of ribbon 10 will provide the generally U-shaped edge protectors 16c, 16d which are joined integrally one to another along the upper surface of the ribbon 10. As such, the sleeve and the edge protectors 16c, 16d do not need to be installed during a separate operation. As noted previously, the knurled edges 10a of the ribbon 10 present a roughed surface to the edge protectors 16c,

16d thereby anchoring the ribbon 10 thereto. However, if desired, an adhesive may be alternatively or additionally be applied to the edges 10a of the ribbon stock 10 prior to being drawn through the cross-head die 12a so that the resulting edge protectors 16c, 16d remain physically in place during handling. Also, in the embodiment depicted in FIGURES 2 and 3 wherein only strip 16a is removed, there will also exist generally triangular sleeve remnants 16-2 integrally attached at their bases to the sleeve. Such remnants 16-2 will thus extend downwardly through the hole remaining in the ribbon 10 by virtue of the nails 10-1 being formed in the coining/punching operation 32 and thereby also assist to minimize lateral slippage of the sleeve relative to the ribbon 10.

Thus, while the invention has been described in connection with what is presently considered to be the most practical and preferred embodiment, it is to be understood that the invention is not to be limited to the disclosed embodiment, but on the contrary, is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims.